



Preparation Guidance for Innovative Technology Summary Reports

Prepared for
U.S. Department of Energy
Office of Environmental Management
Office of Science and Technology

May 2001

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SECTION 1

PURPOSE

The purpose of this document is to provide guidance on preparing Innovative Technology Summary Reports (ITSRs). ITSRs provide a means for technology developers to summarize their technologies, potential applications, cost and performance data, occupational safety and health considerations, and other pertinent information concisely and consistently. An ITSR documents technology demonstration(s) and serves as a source for marketing information for technical and nontechnical audiences. As a technology summary, it shall authoritatively present information on the key innovative technology characteristics, cost, schedule, safety, and performance of the innovative technology in comparison with the baseline and other competing technologies (where practical). It shall also provide information on commercial availability, technology readiness for implementation, and how a specific technology performed under defined operating parameters in demonstration(s). Every effort should be made to include the key data mentioned throughout this guidance. However, if information is not included, the ITSR should point out and explain the omission. To provide sources for more detailed information, references shall be provided in the first appendix in each ITSR.

A principal goal of the ITSR is to help site decision makers judge the innovative technology's potential for implementation at their sites. Therefore, the ITSR shall clearly present the range of problems that the innovative technology can address and its advantages to the DOE cleanup in terms of system performance, cost, site closure schedule, and cleanup effectiveness. The information in ITSRs should enable potential customers to decide quickly whether a technology would apply to a particular environmental management problem and/or whether additional information should be gathered. Each ITSR supports the EM-1 Action Plan on Technology Deployment, specifically item 3, which calls for Site-Specific Deployment Plans to be developed by each Environmental Management (EM) Field Office in conjunction with the Site Technology Coordination Groups, line program managers, site project engineers, and stakeholders.

An ITSR shall be prepared within a few months after the completion of pilot-scale or full-scale demonstrations as a technology is transferred from the U.S. Department of Energy's (DOE's) Office of Science and Technology (OST) to customers for implementation. A review is held after the demonstration to determine whether sufficient information is known about the technology to justify its progress to the next stage in the development process. ITSRs summarize the information prepared for the final review, usually at Gate 5 or 6 in the OST stage-gate decision process, before the technology is transferred to the customer for implementation.

A data file of information needed for ITSRs should be generated prior to demonstrations so an ITSR can be finalized quickly for the technology review process after the completion of pilot-scale or full-scale field testing and demonstration. If a full-scale field demonstration is planned and has joint funding with Environmental Restoration (EM-40), the EM-40 team member will prepare a Cost and Performance Report in accordance with the DOE Office of Environmental Restoration guidance (U.S. Department of Energy 1996) at the conclusion of the demonstration.

The latest guidance, templates, samples, and points of contact for ITSR production are available on the OST web site at www.em.doe.gov/ost.

SECTION 2

DOCUMENT CONTENTS

Covers and Front Matter

The covers and front matter shall be prepared by the Infrastructure Support Team (IST) in EM54 when an ITSR is near the final production stage. However, the Focus Area (FA) or Crosscutting Program (CP) must provide the information as indicated below. All ITSRs shall have a front cover with the following information:

- the name of the technology as used in the Technology Management System (TMS) (provided by the FA/CP),
- the lead FA/CP(s) (provided by FA/CP),
- a listing of DOE, EM, and OST as the preparers of the document, and
- the month and year the ITSR is released.

All ITSRs shall have a title page with the following information:

- the name of the technology (as it appears on the cover),
- the Tech ID # (provided by FA/CP),
- the lead FA/CP(s) (as on the cover), and
- the demonstration sites, including the specific location and state (provided by FA/CP).

On the page immediately following the title page, the following ITSR purpose statement shall appear:

Purpose of this document

Innovative Technology Summary Reports are designed to provide potential users with the information they need to quickly determine if a technology would apply to a particular environmental management problem. They are also designed for readers who may recommend that a technology be considered by prospective users.

Each report describes a technology, system, or process that has been developed and tested with funding from DOE's Office of Science and Technology (OST). A report presents the full range of problems that a technology, system, or process will address and its advantages to the DOE cleanup in terms of system performance, cost, and cleanup effectiveness. Most reports include comparisons to baseline technologies as well as other competing technologies. Information about commercial availability and technology readiness for implementation is also included. Innovative Technology Summary Reports are intended to provide summary information. References for more detailed information are provided in an appendix.

Efforts have been made to provide key data describing the performance, cost, worker safety, and regulatory acceptance of the technology. If this information was not available at the time of publication, the omission is noted.

All published Innovative Technology Summary Reports are available on the OST Web site at www.em.doe.gov/ost under "Publications."

This page is followed by the table of contents and then the body. The inside covers are blank. The back cover does not have text.

Internal Organization

ITSRs shall be divided into eight sections:

1. Summary
2. Technology Description
3. Performance
4. Technology Applicability and Alternatives
5. Cost
6. Occupational Safety and Health
7. Regulatory and Policy Issues
8. Lessons Learned

Easy readability is particularly important for Sections 1–5 of the ITSR (i.e., having simple graphics, using consistent formats for presenting and comparing data for different demonstrations or technologies, avoiding acronyms, etc., given the broad audience). The ITSR shall be of a peer-reviewed quality. Clear and concise presentation is needed so that (1) prospective users can understand the demonstration and determine whether the technology is appropriate for their sites and (2) nontechnical readers can recommend that the technology be considered by prospective users.

One of the major advantages of the ITSR over a standard final report is its conciseness: it is a summary report with the details contained in the reference documents. The goal is to present the summary information in a bulleted and tabular format with extensive graphics to highlight key information about the technology and its potential application. ITSRs should have about 10–15 pages in the body and no more than 15 pages of appendices. Long paragraphs and wordy descriptions shall be replaced, where possible, with graphics and bulleted sentences. However, it is important that bulleted text begin with information that puts the bullets into context.

ITSRs shall also include appendices for the references and other information too detailed for the body of the report, such as a more in-depth description of the demonstration site, detailed cost and performance data, and commercialization and intellectual property issues. Claims made in the body of an ITSR regarding cost, performance, and interpretations of regulations, etc. shall be supported by citations of references in the first appendix or direct referrals to other appendices.

Section 1. Summary

The Summary section of the ITSR (preferably not more than two pages) shall give the reader a brief overview of the technology. More than any other section, the Summary shall be of high quality and concise in comparing the innovative technology to other technologies, including the baseline, to show site decision makers its potential for implementation or inclusion in their Site Deployment Plans. The subsections in the Summary can vary; however, the following subsections are recommended:

- Technology Summary
- Demonstration Summary
- Contacts

The Technology Summary subsection of the ITSR should (1) be no longer than one page, (2) include a photograph or diagram of the technology (the photo or graphic shall be provided in electronic form and as an original; see Section 3 for details), and (3) address the topics listed below. The following subsections are recommended to assist reader comprehension:

- Problem: The problem areas the technology can address.
- How It Works: Major features of the technology, including an overall concept of how it works.
- Potential Markets: Potential markets for the technology (i.e., specific DOE problems it could address and those sites known to have committed to or implemented the technology; also if known, potential non-DOE applications).

- Advantages over the Baseline: The technical and economic advantage(s) of the technology over baseline and/or competing technologies (e.g., lower cost, accelerated schedule, more complete cleanup, more stable waste form, increased safety) as related to the potential markets. Quantitative comparisons are preferred where possible. This topic could also provide insight into the disadvantages or shortfalls the technology has, if any (e.g., conditions under which the technology should not be used at this time), and unique operator skills required, or avoided, in the innovative vs. the baseline technology.

A summary of the remaining information in the ITSR should be provided in a subsection entitled Demonstration Summary. The subsection should not exceed one page and should include a statement that “This report covers the period of XX–XX (e.g., 6/94–2/96).” The following topics should be addressed:

- the demonstration site(s), location(s), and date(s); for each site, a brief description of the specific problem(s) targeted and its importance or critical nature; if more than one demonstration was done, a statement about what additional capability of the technology was shown by each demonstration;
- a brief description of the site(s) and the key characteristics of the technology favoring its application at the site;
- key results of the demonstration and advantages over baseline (in terms of performance, cost analyses, worker safety, comparison, special applications and other considerations);
- all parties involved with the demonstration;
- occupational safety and health issues
- regulatory considerations and policy issues, if any;
- commercial availability and readiness for application of the technology (i.e., vendors and licensees); and
- future plans.

The Summary section should conclude with a Contacts subsection that gives the names, affiliations, e-mail addresses, and telephone numbers of resources the reader can contact to obtain additional information on the technology. The Contacts subsection should include the following information, as applicable, beginning with the subheadings shown:

- Technical: principal investigator(s) and other key support individuals;
- Management: OST HQ and field office contacts,
- Licensing,
- Permitting, and
- Other: Include the following statement—“All published Innovative Technology Summary Reports are available on the OST Web site at www.em.doe.gov/ost under “Publications.” The Technology Management System (TMS), also available through the OST Web site, provides information about OST programs, technologies, and problems. The Tech ID for [technology name] is [number].”

Section 2. Technology Description

This section shall provide the reader with a more detailed description of the technology than given in Section 1 with appropriate discussion of schematic drawing(s) of the technology and the associated system flow train. A written description of the system and any major subsystems necessary to understand the functions of the technology shall also be included with appropriate schematics.

The subsections recommended for most ITSRs are Overall Process Definition and System Operation. The following topics are suggested for inclusion in the two subsections.

- Overall Process Definition
 - demonstration goals and objectives;
 - description of the technology, including schematics;
 - basic principle(s) of the technology;
 - description of key or major elements of the technology and any support equipment/systems (such as loading system, melt furnace, control system, and off-gas systems for a vitrification technology);
 - photographs(s) and/or diagram(s); and
 - specific DOE application for this demonstration.
- System Operation
 - operational parameters and conditions;
 - materials, energy requirements, and other expendable items that will be used in operation;
 - manpower skills and training requirements (human resources, number of people);
 - secondary waste stream considerations; and
 - potential operational concerns and risks (safety, environmental).

Section 3. Performance

The Performance section of the report presents the demonstration performance data with emphasis on an innovative technology's ability to solve a cleanup problem. If more than one demonstration is being or has been previously reported, the gain from each demonstration in terms of applicability of the technology to more problems, conditions, or contaminants, or in terms of confidence, etc., shall be stated; presentation of technical results from each demonstration may not be needed.

The section shall present an overview of the demonstration(s) just completed, including a definition of the problem addressed, key parameters and other important operational information, key results relative to the cleanup problem requirements (i.e., system cost, operating and maintenance costs, performance, safety and health considerations, and effectiveness), and a brief comparison with projected performance of the baseline technology. Key points of the demonstration plan shall be described within this overview. Provide site-specific conditions that will affect the operation of the technology, for example, soil moisture content for in situ vitrification. If extensive site information is required, it shall be summarized in this section and a complete description added as an appendix to the report.

The section should be two to four pages long and use graphical presentation for effectiveness. Suggested subsections and elements for inclusion follow.

- Demonstration Plan
 - demonstration site description,
 - major objectives of the demonstration as they relate to DOE environmental requirements,
 - major elements of the demonstration (i.e., specific operations evaluated), and
 - boundaries of the demonstration (i.e., specific cleanup goals addressed vs. not addressed).
- Results
 - area/volume treated or characterized,
 - efficiency/removal/destruction rate, and
 - comparison to baseline or competing technology(ies).

Section 4. Technology Applicability and Alternatives

As the title suggests, this section shall describe applications of the technology and competing technologies, one of which shall be the baseline. Advantages and shortfalls of each technology shall be discussed, as well as how the technology is more or less effective than another in solving aspects of the cleanup problem addressed. Presenting the true capabilities of each technology and where it will fit best into the marketplace is important. Discussions of each technology's maturity and any further development that is planned or proposed and how this will expand the technology's applications shall also be included. Note that the technologies compared here shall be compared for cost in the next section. Suggested subsections and topics for inclusion follow.

- Competing Technologies
 - baseline technologies,
 - other competing technologies, and
 - comparisons with this technology (advantages and disadvantages of each).
- Technology Applicability
 - other potential applications,
 - the parameters that should be considered for other applications,
 - scale-up requirements, and
 - future technology selection considerations (specific considerations determining the usefulness of this technology for a user's problem).
- Patents/Commercialization/Sponsor
 - patent/licensing issues;
 - commercial involvement by private industry;
 - sponsors, including DOE-EM organizations; and
 - potential privatization of technology.

Section 5. Cost

Reduction in cost of cleanup is one of EM's major cleanup goals and one of the four corporate performance measures for EM's science and technology effort (U.S. Department of Energy 1998a). To support this performance measure, a cost savings analysis must be obtained comparing the cost of cleanup using innovative technology to that using the base technology. For this section of the ITSR, the comparison shall be done in a manner consistent with the EM standard life-cycle cost savings methodology (U.S. Department of Energy 1998b). This methodology is consistent with current site practice and with the standard approach of increasing the uncertainty in the estimated costs and cost savings as the information needed for the estimate becomes less certain.

This section shall present highlights using "reader-friendly" graphs and comparison tables where possible to compare the technologies discussed in Section 4. Details shall be presented in an appendix, if necessary. If cost comparison information cannot be given for technologies covered in Section 4, an explanation of why this cannot be done shall be provided. This section of the report should have, at a minimum, three subsections: Methodology, Cost Analysis, and Cost Conclusions.

- The Methodology subsection should include pertinent information to assist the reader in evaluating the information in the cost section, such as the following:
 - how the cost information was collected,
 - cost analysis methodology,
 - support groups that may have assisted with the analysis, and
 - basic assumptions and baseline technology used.

- The Cost Analysis subsection should contain tables comparing this technology to the baseline and any appropriate competing technologies. Text narratives shall also be used where appropriate to present the data in the most effective manner. The information should include the following:
 - Capital costs of the demonstration (e.g., outlays a user can expect during implementation of the technology). The actual costs of the equipment used in the demonstration should be used wherever possible, with adjustments to correct for demonstration-specific requirements.
 - Operating and maintenance costs (i.e., those expenditures the end user could expect to encounter during operation of the technology such as for power, repair/replacement, inspection, sampling, and waste disposal). Again, the actual costs from the demonstration should be used, where possible, to give some sense of reality to the analysis.
 - Anticipated implementation costs for potential users (e.g, permit and installation costs).

Text narrative should address the following areas:

- any scale-up costs that can be expected (e.g., design and construction costs) and
- cost-benefit analysis, following the DOE EM standard method for performing cost analysis for innovative technologies, to develop a comparison against one baseline technology described in Section 4.
- The Cost Conclusions subsection should include the following:
 - unit cost bottom line (e.g., dollars/pound, dollars/volume treated or characterized);
 - any planned enhancements or amendments to the technology that will generate additional costs or savings; and
 - overall cost savings comparison with baseline and competing technologies.

Section 6. Occupational Safety and Health

This section is designed to ensure a consistent level of quality in OST's safety and health practices. The criteria described in the Policy for Occupational Safety and Health in EM's Science and Technology Program, January 12, 2001, shall be used as a guide to developing this section. Safety and health goals to be emphasized in this section include:

- Communication to technology users of the advantages of safer technologies developed by OST and
- Development and selection of new technologies that, by their use, improve workplace safety and health in comparison to competing technologies.

This section shall present information to help the technology user understand the occupational safety and health implications of the technology and especially how the new technology compares with the baseline or other alternatives. Address the following points to convey this information to the potential user:

- Health and safety risks to workers who operate the technology compared to risks associated with the baseline technology or competing technologies.
- Health and safety risks to maintenance workers who service the technology, compared to risks associated with the baseline technology or competing technologies.
- Required safety and health measures—such as environmental or medical monitoring, personal protective equipment, safety and health training—that will be needed to implement this technology. Include a comparison of these safety and health requirements to those associated with implementation of the baseline technology. If the technology is of a type for which a Technology Safety Data Sheet (TSDS) is appropriated, reference the TSDS, which will be in an Appendix.
- Summary of occupational safety and health lessons learned from the demonstration of this technology, including a reference to the health and safety plan used in the demonstration.

Section 7. Regulatory and Policy Issues

This section describes what the customer can expect in terms of regulatory requirements related to implementing this technology. It shall describe permitting requirements that will be applicable and public policies that the technology might affect. The section should be no more than two pages long and include the following information.

- Regulatory Considerations
 - Site-specific regulatory/permitting issues (i.e., specific to the demonstration site or state).
 - Comparison of regulatory/permitting requirements with baseline or other technologies, where possible showing advantages of the innovative over other technologies.
 - Secondary waste stream regulatory considerations.
 - Each of the nine Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) evaluation criteria. If CERCLA does not apply, the section should state this fact, but then continue with an evaluation of the technology using the CERCLA criteria. If information has not been developed for a specific criterion, this fact should be stated. The nine CERCLA evaluation criteria are summarized below.
 1. Overall protection of human health and the environment describes how existing and potential risks from pathways of concern are eliminated, reduced, or controlled through treatment, engineering controls, institutional controls, or by combination of controls.
 2. Compliance with ARARs (applicable or relevant and appropriate requirements)—addresses whether an alternative meets its respective chemical-, location-, and action-specific requirements or can invoke a waiver for an ARAR.
 3. Long-term effectiveness and permanence—evaluates performance alternatives in protecting human health and the environment after response objectives have been met and includes
 - magnitude of residual risk (untreated waste and treatment residuals) and
 - adequacy and reliability of controls (engineering and institutional) used to manage untreated waste and treatment residuals over time.
 4. Reduction of toxicity, mobility, or volume through treatment—assesses performance of alternatives in terms of reducing toxicity, mobility, or volume through treatment and whether or not statutory preference for treatment as a principal element is satisfied.
 5. Short-term effectiveness—addresses the impacts of alternatives on human health and the environment during construction and implementation until response objectives are met and the length of time until protection is achieved.
 6. Implementability—assesses degree of difficulty and uncertainties with undertaking specific technical and administrative steps and the availability of various service and materials.
 7. Cost—addresses costs of construction (capital) and necessary costs of operation and maintenance (present worth analysis assumes 10 percent discount rate, and the periods of performance for costing purposes should not exceed 30 years).
 8. State (support agency) acceptance—evaluates technical and administrative issues and concerns the support agency may have regarding each of the alternatives.
 9. Community acceptance—evaluates concerns the community may have for each alternative.

For additional information on the nine evaluation criteria, see the NCP, 40 CFR 300.430(d).

- Risks, Benefits, Environmental and Community Issues

- community safety issues,
- potential environmental impacts,
- potential exposures,
- liability risk,
- potential socioeconomic impacts and community perceptions, and
- comparison with baseline and competing technologies, where applicable.

Some of these items may be covered in the Regulatory Considerations subsection above. If so, they do not need to be repeated here.

Section 8. Lessons Learned

The Lessons Learned section is the most critical section in terms of continuous improvement. It discusses any outstanding design issues and/or problems that may have been encountered during the demonstration or post-demonstration activities and actions taken to correct them. It shall cover anything unique to the system that would need to be addressed before implementation could occur. It also shall discuss what needs to be done to prepare the technology for commercialization by private industry. The following subsections are recommended:

- Implementation Considerations
- Technology Limitations
- Needs for Future Development (this subsection can be combined with the previous subsection)
- Technology Selection Considerations (including applicable safety and health experience)

Back Matter

ITSRs shall not have a credits page or distribution list but shall contain appendices as follows.

References

ITSRs are meant to be brief summaries of new technologies and the development/demonstration data associated with them. Since ITSRs provide potential customers with a brief overview of technologies available for use, supporting documentation is vital to the decision makers. ITSRs shall use the author-date system of documentation (University of Chicago Press 1993). This system has two parts: a citation in running text or parenthesis and a list of sources cited. References shall be the first appendix in all ITSRs. Documents and reports cited in the References appendix shall be published reports readily available to potential users seeking additional information.

A citation—the authors' last names followed by the date of publication, not separated by punctuation—can be made in running text or enclosed in parentheses:

Field demonstrations confirmed the end concentrations predicted in Jones 1997.

Predicted end concentrations (Jones 1997) were confirmed in field demonstrations.

One author	(Jones 1997)
Two authors	(Jones and Smith 1997)
Three authors	(Jones, Smith, and Black 1997)
More than three authors	(Jones et al. 1997)
Corporate author	(EPA 1992)

The References appendix shall listed complete information for publications cited within the text, arranged alphabetically by the principal author's last name. Many acceptable variations exist for formatting references; however, the reference section should provide enough information so a reader can readily obtain the referenced material. Keep in mind that the "main criteria of acceptability are clarity, consistency,

and usefulness" (University of Chicago Press 1993). Guidelines, formatting, and samples for some common source documents are provided below.

- Periodical references should include

- author(s)
- year
- title of article (sentence-style capitalization)
- title of periodical (title-style capitalization, italicized)
- issue information (volume, issue number, month/season)
- page numbers

Baker, E., and B. Leach. 1995. Soil fracturing cracks soil remediation barriers. *Environmental Solutions* (March): 26–27.

Frank, U. 1994. U.S. Environmental Protection Agency's Superfund innovative technology evaluation of pneumatic fracturing extraction. *Journal of Air Waste Management* 44(10): 1219–23.

- Book references should include

- author(s)
- year
- title (sentence-style capitalization)
- editor (if applicable)
- edition (if not the first)
- city of publication and publisher
- page numbers (if applicable)

University of Chicago Press. 1993. *The Chicago manual of style*. 14th ed. Chicago: University of Chicago Press.

American Petroleum Institute. 1995. *Petroleum-contaminated low-permeability soil: Hydrocarbon distribution processes, exposure pathways, and in situ remediation technologies*. American Petroleum Institute, Health and Environmental Sciences Dept. Publication No. 4631.

- Papers presented at meetings can be cited if published in proceedings:

Keffer, E. B., J. J. Liskowitz, and C. D. Fitzgerald. 1996. The effect of pneumatic fracturing when applied to ground water aquifers, pp. 23–29 in *Proceedings of the National Ground Water Association Annual Educational Conference*, October 2–5, Chicago.

- Sample references for public documents follow.

Rinker, M. W., J. A. Bamberger, and J. A. Yount. 1998. *EM-50 Tanks Focus Area retrieval process development and enhancements, FY98 technology development summary report*. PNNL-12015. Richland, Wash.: Pacific Northwest National Laboratory.

U.S. Department of Energy. Office of Science and Technology. 1994. *Innovation investment area*. DOE/EM-0146P.

- Since documents published only on the Internet can change, citations should contain both publication and retrieval dates:

Oak Ridge Site Technology Coordination Group. 1997. Remediated tank isolation and removal, in *Oak Ridge Technology Needs Database*. Retrieved June 10, 1999 from the World Wide Web: <http://www.em.doe.gov/techneed/tk10.html>.

Other Appendices

Detailed information that would be useful to the reader can be presented in other appendices; however, ITSRs should be brief documents. Readers should be able to get additional information from documents

referenced in the first appendix and from contacts provided in the Summary section. If the technology is of a type for which a Technology Safety Data Sheet is appropriate, the TSDS shall be included as a separate appendix.

Last Appendix

A list of acronyms and abbreviations is not required; however, if the ITSR does contain one, it should be the last appendix.

SECTION 3 FORMATTING

This section presents basic formatting guidelines for ITSRs. A template in Microsoft Word is available at www.em.doe.gov/ost under “Guidance”.

Basics

- Follow the *GPO Style Manual* (U.S. GPO 1984) for rules on grammar and usage.
- If a unit of measure is used just a few times in an ITR, it is best to write it out to avoid confusion.
 - 34 seconds (rather than 34 s)
 - 6 hours (rather than 6 h)
- When units of measure frequently recur within an ITR, they can hinder readability. In these cases, enhance readability by using the standard letter symbols shown in the *GPO Style Manual* (U.S. GPO 1984). These letter symbols are used only when following a numeral.
 - 12 ft
 - several feet
- Some units of measure that commonly occur in ITSRs are listed below. Note: these letter symbols do not end with periods and are the same whether the unit is singular or plural.

– cubic feet per minute	ft ³ /min
– hour	h
– inch	in
– linear feet	lin ft
– pound	lb
– second	s
- If a unit of measure recurs throughout an ITR, but the letter symbol is not likely to be recognized by nontechnical readers, define it upon its first use.
 - 12 linear feet (lin ft)—first use
 - 12 lin ft—thereafter
- Use Arial 10-point type, if available, as the standard document text font and type size. (This style guide is in Arial 10-point type.) If Arial is not available, use Helvetica 10-point.
- Put subsection headings (e.g., the “Technology Description” subsection in ITR Section 1) in bold, Arial 12-point type, with a ¾-point margin-to-margin bottom border (as in this guidance).
- Put topic headings within subsections in bold, Arial 10-point type (as in this guidance).
- Footer contains only a centered page number.
- Margins: 1-inch side, 0.5-inch top and bottom
- Use left justification.
- Leave one blank line between paragraphs; do not indent.
- Use only one space between sentences.
- Hang indent references, as shown in this document.

- Bulleted lists
 - Double space before and after bulleted lists.
 - Single space between short bulleted items; add a blank line if items have multiple lines or to improve readability.
 - Use standard bullets with size set to “auto” to match the font size; use en dashes for second level.
 - Hang indent text 0.25 inch.
 - If bulleted items contain complete sentences, capitalize and end with a period. If items are part of a sentence, do not begin with an initial capital; separate with commas or semicolons as appropriate, and end with a period.

Tables

- Tables shall be numbered serially, called out in the text, and placed after the call out.
- Table captions shall be centered above the tables in bold lettering. Sentence style capitalization is used; however, a period shall not be used at the end of the caption.
- Tables shall be able to stand alone; therefore, any abbreviations used in them shall be defined somewhere in the caption, table, or footnotes.
- Tables should be provided in electronic form within the text of the ITSr. Landscape tables are discouraged but acceptable when necessary.

Figures and Other Graphical Materials

- All figures shall be numbered serially, called out in the text, and placed after the call out.
- Figure captions shall be centered below the figures in bold lettering; use sentence-style capitalization and a closing period.
- Figures shall be able to stand alone; therefore, any abbreviations used in them shall be defined somewhere in the figure or caption.
- Landscape graphics are discouraged but can be used where justified. To ensure quality printing, photographs and drawings must be scanned at 300 dpi at 100 percent the printed size.
- Colors in graphics will appear when the ITSr is made available on the Internet, but since they are printed in black and white, images and labels should be legible when reduced to gray scale.

SECTION 4

APPROVAL AND PRINTING PROCESSES

The latest guidance, templates, samples, and points of contact for ITSR production are available at www.em.doe.gov/ost. Figure 1 shows the process for writing, reviewing, and producing an ITSR.

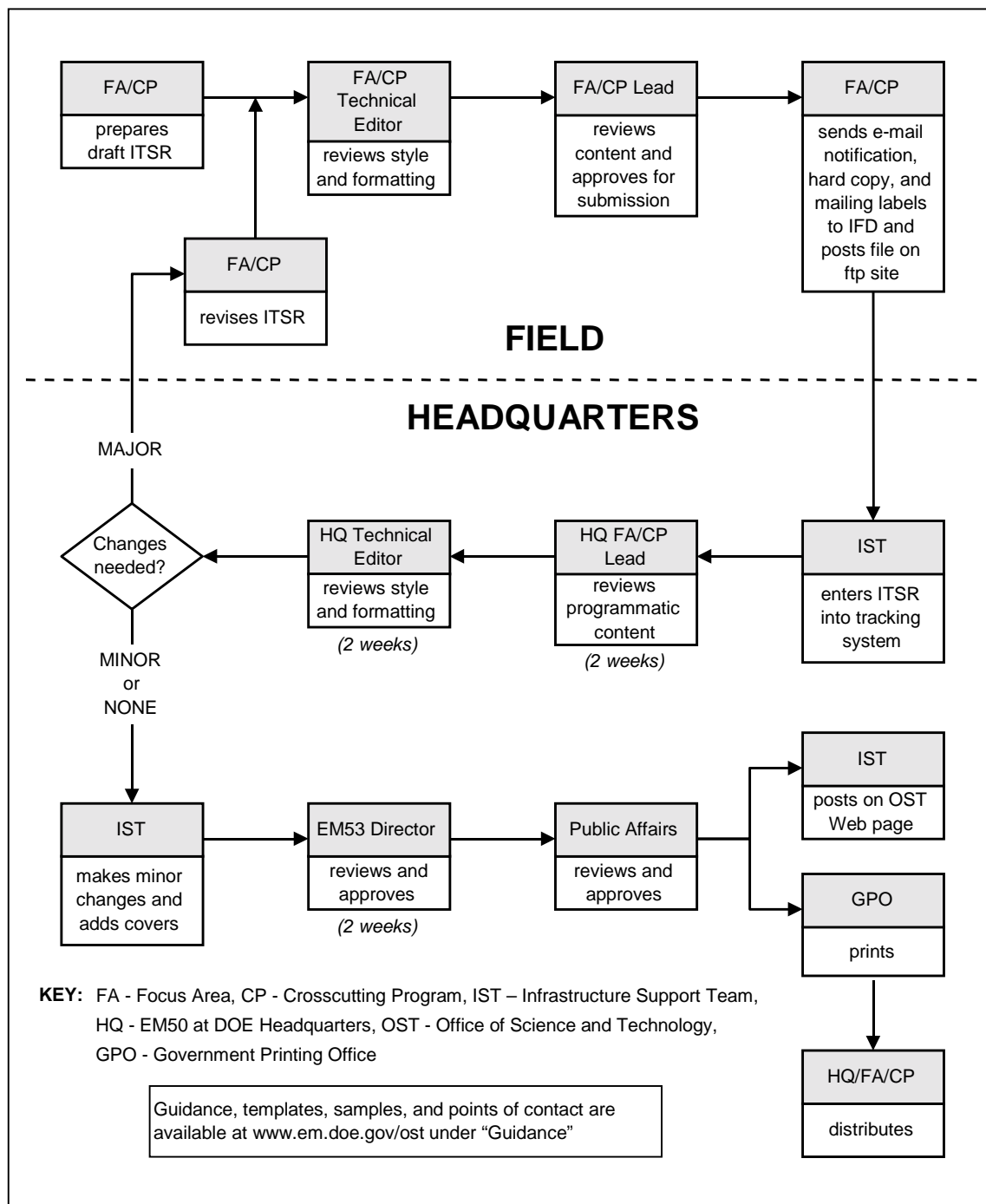


Figure 1. Process for writing, reviewing, and producing ITSRs.

- The principal investigator (PI) provides the required information to the FA or CP so a draft ITSR can be prepared. The FA/CP may choose to have the PI be responsible for the initial preparation of the ITSR. Regardless of who prepares an ITSR, the PI must be familiar with the information required in an ITSR early in the technology development process to ensure the required data is collected during bench-scale, pilot-scale, and full-scale testing.
- FA/CPs are responsible for ensuring that ITSRs are prepared in draft before the Engineering Development review (Gate 5) or the Demonstration review (Gate 6). The FA/CP is also responsible for establishing the benchmark for the technology to be measured against. The baseline technology cost and performance information shall be provided to the ITSR preparer by the FA/CP. Access to this information is vital to the quality and usefulness of an ITSR's content.
- Additional information useful for preparing an ITSR includes:
 - documents published by investigators,
 - cost estimates,
 - occupational safety and health information
 - regulatory guidance and correspondence, and
 - stakeholder correspondence.
- While an ITSR is being drafted, it is important to incorporate the input of a technical editor who can assist with following this guidance and enhance the editorial quality of the final document. When the draft is completed, the technical editor reviews the style and formatting, and the field FA/CP Lead reviews the content. The reviewers may use the ITSR checklist (Appendix B) as a record of their comments. Before approving the ITSR for submission to HQ, the field FA/CP lead should ensure the material has undergone a peer review and that all interested parties (including the technology vendors) have concurred on the information.
- The FA/CP sends mailing labels and a “camera ready” printed copy of the ITSR to the EM-54 Infrastructure Support Team (IST). “Camera ready” means a clean, single-sided copy ready to be photographed for the printing process. Formatted lists for producing mailing labels can be downloaded from the OST Mailing List Management tool on the OST web page.
- The FA/CP enters the ITSR publication information in the planning section of the TMS, posts an electronic copy of the ITSR on the ftp site (<ftp.em.doe.gov/pub/incoming/ITSRs>) in the appropriate focus area or crosscutting program folder, and notifies the IST by e-mail of the name and location of the file. If no changes (or only minor changes) are needed after HQ staff review, this file can be used for final production (printing and posting on the OST Web page).
- HQ staff review the ITSR for programmatic content, editorial style, and formatting. The reviewers may use the ITSR checklist (Appendix B) as a record of their comments. Comments are sent to the FA/CP for additions and corrections as needed. If major changes are required, the changes are reviewed again by HQ staff. If only minor changes are needed, the IST may be able to edit the electronic copy.
- After final review and approval by the EM53 director, the IST adds the covers and DOE publication number and coordinates Public Affairs Office review, GPO printing, and posting on the OST Web site.
- IST distributes ITSRs based on FA/CP mailing labels and other requests received.

APPENDIX A REFERENCES

University of Chicago Press. 1993. *The Chicago manual of style*. 14th ed. Chicago: University of Chicago Press.

U.S. Department of Energy. 1996. *Documenting cost and performance for environmental restoration projects*. DOE/EM-0302.

U.S. Department of Energy. Office of Environmental Management. 1998a. *Environmental Management research and development program plan*.

U.S. Department of Energy. Office of Environmental Management. 1998b. *Standard life-cycle cost-savings analysis methodology for deployment of innovative technologies*.

U.S. Government Printing Office. 1984. *United State Government Printing Office style manual*. Washington: U.S. Government Printing Office.

APPENDIX B

ITSR CHECKLIST

Technology:_____

Reviewer:_____

Element	Accept	Reject	Comment
1. SUMMARY			
Technology Summary			
Problem			
How It Works			
Advantages Over the Baseline			
Demonstration Summary			
Specific Problem and Site Characteristics			
Key Results			
Contacts			
Clarity of Text and Figures for Site Decision Maker			
2. TECHNOLOGY DESCRIPTION			
Overall Process Definition			
System Operation			
Clarity of Text and Figures for Site Decision Maker			
3. PERFORMANCE			
Demonstration Plan			
Results			
Clarity of Text and Figures Relative to Demo			
Requirements for Site Decision Maker			
4. TECHNOLOGY APPLICABILITY AND ALTERNATIVES			
Competing Technologies			
Innovative Technology vs Baseline			
Technology Applicability			
Future Technology Selection Considerations			
Patents/Commercialization/Sponsor			
Clarity of Text and Figures for Site Decision Maker			
5. COST			
Methodology			
Cost Analysis			
Cost Savings vs Alternative Technologies			
Cost Conclusions			
Clarity of Text and Figures for Site Decision Maker			
6. OCCUPATIONAL SAFETY AND HEALTH			
Comparisons to baseline and alternative technologies			
Safety and health measures required			
Safety and health lessons from demonstration			
Clarity of Text and Figures for Site Decision Maker			
7. REGULATORY AND POLICY ISSUES			
Regulatory Considerations			
CERCLA Criteria			
Risks, Benefits, Environmental and Community Issues			
Clarity of Text and Figures for Site Decision Maker			

8. LESSONS LEARNED	_____	_____	
Implementation Considerations (Design Issues)	_____	_____	
Technology Limitations/Needs for Future Development	_____	_____	
Technology Section Considerations	_____	_____	
Clarity of Text and Figures for Site Decision Maker	_____	_____	
A. REFERENCES	_____	_____	
B. Technology Safety Data Sheet (if appropriate)	_____	_____	